# Coast to Coast Support of the E-2C Hawkeye using Distributed TSP

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All are Important in Success

- High quality products from multiple teams delivered on time and cost do not happen in a vacuum
- There is a need for common processes extended to those teams, their coaches, and the tools used to automate those processes
- Fundamental to success is consideration of the people in each team
  - Organizational cultures must be connected leading to an important understanding of each others assumptions, values, and styles

People

Process

Product
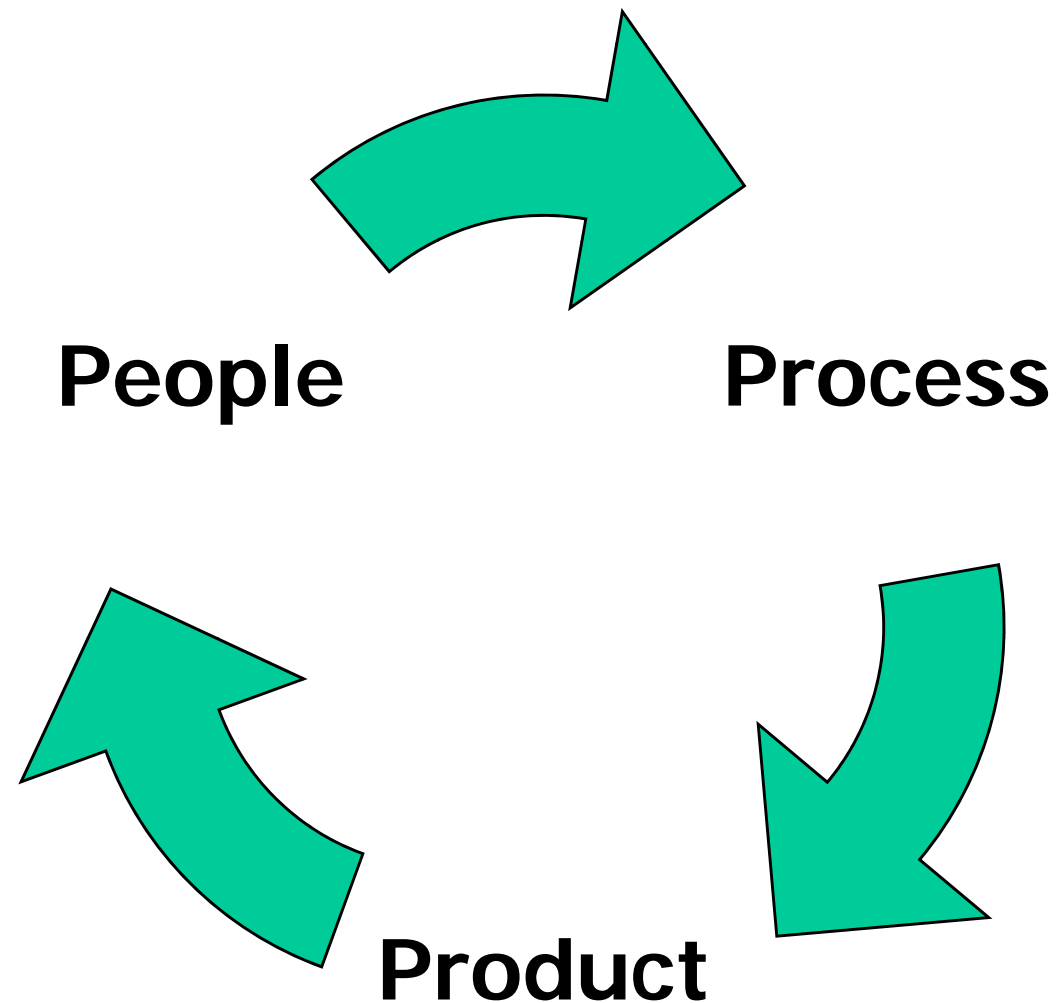
Agenda

- NAVAIR Overview
- E-2C's Challenge
- Basic TSP
- TSP for Distributed Teams
- Cultural Issues
- Team Building
- Observations
- Conclusions

NAVAIR Major Sites

Lakehurst
ALRE - SUPPORT EQ
AIRCRAFT DIVISION

Patuxent River
NAVAIRHQ, PEOs
AIRCRAFT DIVISION

China Lake
WEAPONS DIVISION

Hawkeye 2000

Cherry Point
NADEP DEPOT

Pt Mugu
WEAPONS DIVISION

San Nicolas
Island

NADEP DEPOT

North Island
NATEC DEPOT

Jacksonville
NADEP DEPOT

Orlando
TRAINING SYSTEMS
DIVISION

☆ NAVAIR HQ

● Acquisition/Test/Development Centers

▲ NAVAL AVIATION DEPOTS

E-2C's Challenge

- The E-2C program at Patuxent River in Maryland in 2003 was one of simply having more work than the engineers there could perform in the time allotted.

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E-2C Hawkeye
Navy's all-weather, carrier-based tactical battle management airborne early warning, command and control aircraft for the Carrier Strike Group and Joint Force Commander

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F-14's Legacy

- At the same time engineers at Pt. Mugu in California were working on F-14D delivering its final block release to the fleet.

- When E-2C leadership discovered the available pool of engineers at Pt. Mugu the question became one of how to successfully combine these two groups of engineers into one distributed team
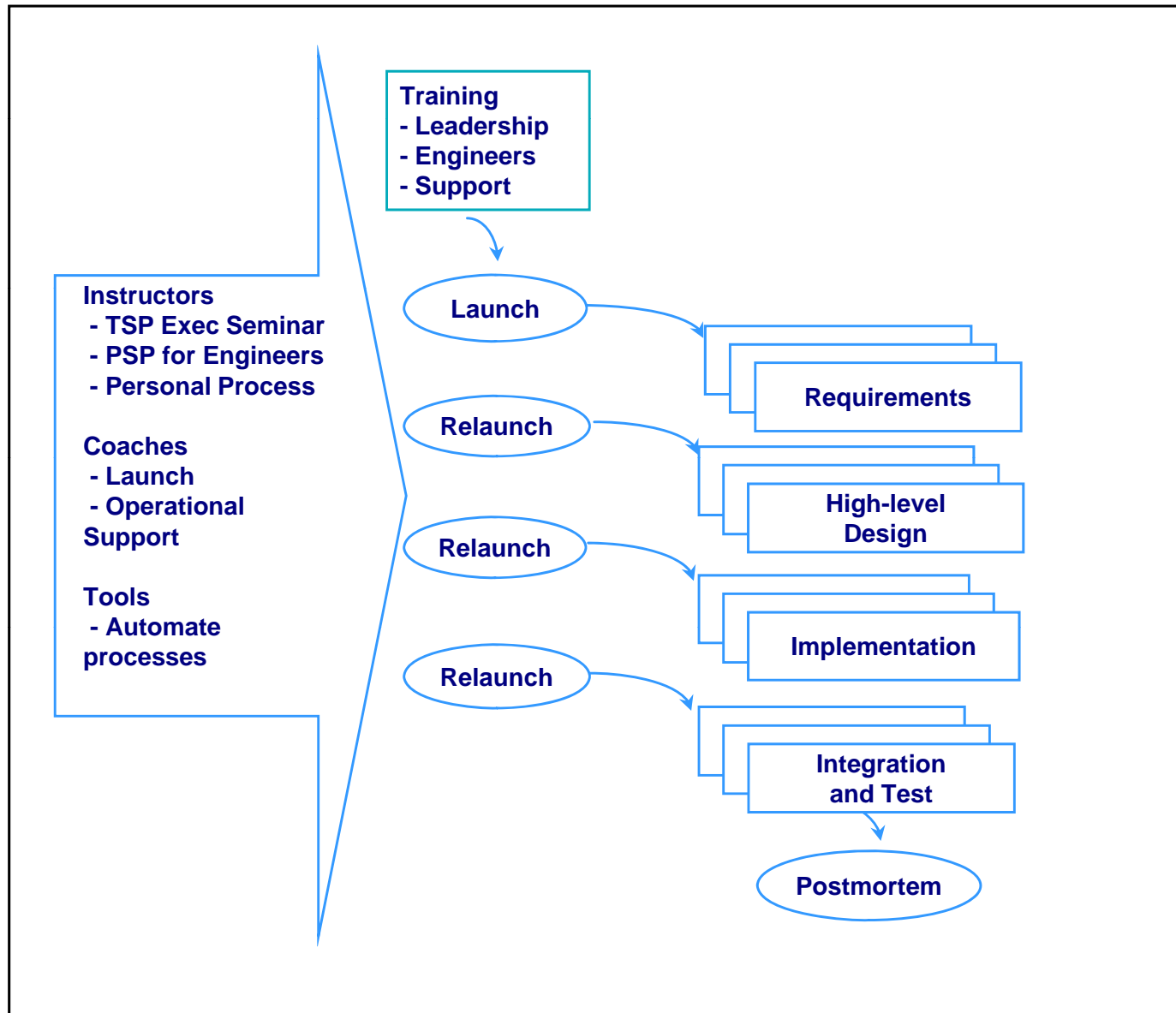

F-14D Tomcat
United States Navy's primary maritime air superiority fighter, fleet defense interceptor and tactical reconnaissance platform from 1974 to 2006

Basic TSP

- Establish common SWE process

- Self-directed team

- Plan work

- Work plan

- Communicate

- Collect measures

  – Track plan

  – Improved estimates

Training
- Leadership
- Engineers
- Support

Instructors
 - TSP Exec Seminar
 - PSP for Engineers
 - Personal Process

Coaches
 - Launch
 - Operational Support

Tools
 - Automate processes

Launch

Relaunch

Relaunch

Relaunch

Requirements

High-level Design

Implementation

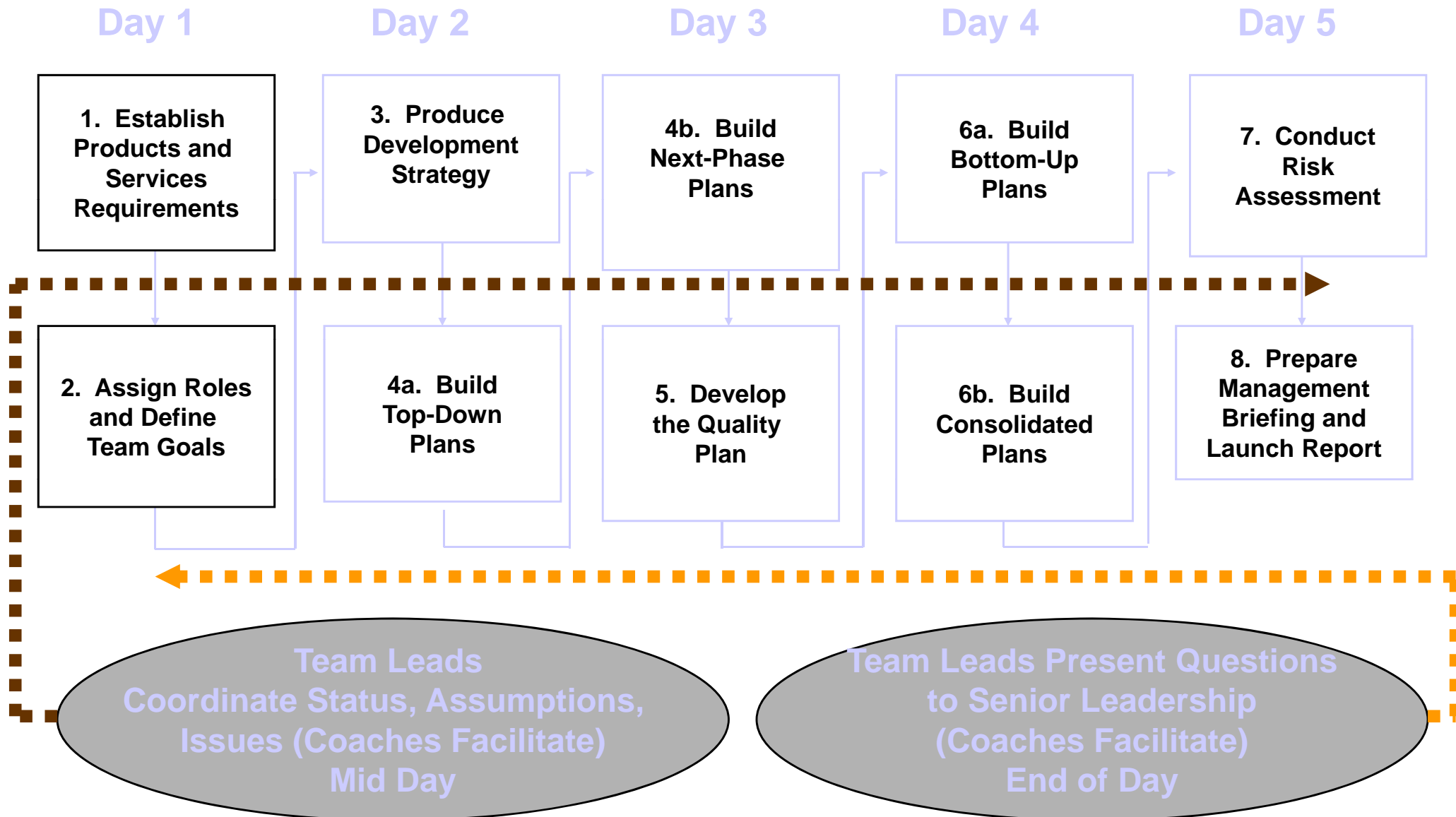Integration and Test

Postmortem

TSP for Multiple/Distributed Teams

- The E-2C program was using TSP to deal with two things
  - <u>Multiple</u> project teams to deliver its product
  - Virtual teams that were <u>Distributed</u> between Maryland and California
- Each project team is self-coordinated with each member acting in one of several technical roles, support roles, and a lead that coordinates all these efforts
- Each of the E-2C project's leads, planning coordinators, and quality coordinators come together in key parts of a multi-team launch
  - Planning coordinators come together before and after top-down and bottom-up plan meetings to check status and test any assumptions
  - Quality managers meet after the quality plans have been generated to do the same
- At the end of each day of launch the leadership team consisting of each project lead and the coaches convene to check status and discover any horizontal issues that may affect each other

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Multi Team Schedule

Day 1 **Day 2** **Day 3** **Day 4** **Day 5**

1. Establish Products and Services Requirements

3. Produce Development Strategy

4b. Build Next-Phase Plans

6a. Build Bottom-Up Plans

7. Conduct Risk Assessment

2. Assign Roles and Define Team Goals

4a. Build Top-Down Plans

5. Develop the Quality Plan

6b. Build Consolidated Plans

8. Prepare Management Briefing and Launch Report

Team Leads Coordinate Status, Assumptions, Issues (Coaches Facilitate) Mid Day

Team Leads Present Questions to Senior Leadership (Coaches Facilitate) End of Day

Cultural Issues

- For the culture change portion the NAVAIR Organizational Development team worked people issues as the PI team focused on processes

- NAVAIR sites had traditionally been perceived as competitors to each other
  - This is a difficult barrier to break through, as many of our working systems still support this
  - Also, the folklore within each site includes stories of past competition

- We needed new stories of successful collaboration to replace the competition stories
  - This team could see the possibilities and we built on that

Cultural Approaches

- E-2C leadership announced from the start that the teaming arrangement would not be one of developer and subcontractor, but rather a single integrated team – a true partnership.
  - One benefit from this partnership is increased resources.
  - Pax needed more engineers and Pt. Mugu needed more work.
  - Without that relationship they would not have been able to give the Fleet all the functionality wanted and needed.
  - The benefit being that E-2C would generate more work for itself and help the program grow.

- In the end the program thought it could be used as an example to follow when considering a successful multi-site team

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Team Building Approach

- The building of the virtual teams was accomplished with two initial events. The first was a three day initial gathering in the June 2003 designed to start the building of a new common culture. Its objectives were to

  1. Get every team member to meet and greet, get to know each other, and have some fun

  2. Share history of each subgroup and establish a vision of the future for this newly formed team

  3. Establish team operating principles and obtain team agreement on basic operations

  4. Identify communications methods and processes for initial team operations

First Team Building - 1

- To meet these objectives the first day was conducted as a set of outdoor activities to get everyone to start to know each other and have fun. Activities were conducted in a park on base at Pax and included various games such as:
  - Celebration of success – developing ways to do so
  - Reflection – what in your past will contribute to success
  - Picture cards
  - Ah-So-Koh circle
  - Newspaper talk – Sharing info
  - Climbing wall
  - Hula hoop lift
  - Reflection – Personal plan
  - …and others…

First Team Building - 2

- The second and third day events were conducted indoors with the goal of increased understanding through historical and present day perspectives. Many of the outcomes of the games and adventures of the first day would be available for use in this second and third day of team building Activities included:
  - Team introductions
  - Team history
  - E2C Lab Tour
  - Myers-Briggs Type Indicator Workshop
  - Strengths/Weaknesses/Opportunities/Constraints (SWOC) chart developed by team
  - Gap analysis determined, solutions proposed, and actions assigned to team members.
  - Team members built joint vision for the future
  - Team members drafted team agreement, mission and vision

Second Team Building

- The second event was performed about eight months into the projects in February 2004.

- A follow up with E2-C project teams was performed by conducting confidential interviews at both sites.

- From topics that emerged, a set of team building topics were presented to team leaders for possible follow up.

- One of the most impressive discoveries from the confidential interviews was that communication between the two sites and team members was going well. A big plus!

Observations

- Product, engineering process and cultural change were important in making this E-2C multi distributed team get started

- With evolving requirements and launches accordingly, these projects still exist and operate in very much the same distributed way as they started nearly five years ago

- While that says a lot, must consider what the real people say…

| Project	Location	Comments
Mission Computer	Pt. Mugu	Team building was valuable "Although some distrust levels were still around after the team building event, the event lay the foundation for the groups to build a functional team to achieve the common goals."
Foreign Military Sales	Pt. Mugu	Had his doubts initially but realized E-2C was serious "…when I saw the effort going in at PAX to provide the training, tools and resources necessary to get the job done here at Point Mugu, I knew management was really supporting this."
Mission Computer	Pt. Mugu	Results were the key. "After successfully delivering many projects within schedule for the Version-5 fleet release, I realized that the "distributed approach" was going to work. If people did not work together as a team to solve problems, they simply cannot achieve such results. Since it was the first project, working together to deliver Version-5 was the most difficult. Several projects after that were flying smoothly."
Display	Pax	Attributes team success to TSP. Has been a team member since March 2004, develops requirements, and detailed design documentation. "TSP provides organization, and communications – As a developer you know exactly what is expected from you from the start of the project. Both managerial and team expectation. In order to accomplish those objectives you need to have strong communication within the teams."
Mission Computer	Pt. Mugu	Technology was an issue. "I think the biggest challenge was and is operating a classified network across the country. Not so much because the technology is not there, but because of all the security hoops that we have to go through to get our network approved."
Leadership	Pax	Technology also helped. "Technology aided in allowing this team to work together. We were able to establish a network, across country which allowed the use of a common data repository and common processes to be used. For example everyone both sites used the same configuration management system."
Display	Pax	Had previous experience on a distributed team, and didn't like it. "It was not well coordinated and I always felt like we were the 'poor-stepchildren' in the process," This time the approach is completely different. "There is high coordination and management attention to the issues involved technically in making it work smoothly. I know that this time I am on the 'big' side (East Coast) and so that may make things different, but I think that there is much more sense that the West Coast folks are 'real' team members, not just hired help."
Mission Computer	Pt. Mugu	Importance of communicating across the sites. "The biggest challenge was communication. Several conference calls, and meetings between the two sites took place. Several visits were made by team management so they could know every team member and build the bridge between them. These efforts definitely helped."

Conclusions

- It is important to understand that real people are the key to any technology improvement being successful, especially when it is a distributed team

- The important thing to realize is that your situation could accomplish the same great success with the buy-in of people from your organization

All are Important in Success

- The **Real** people are key to any technology improvement being successful, especially when it is a distributed team
- Give them a good common process
- Tell them the product and it will happen!

People

Process

Product
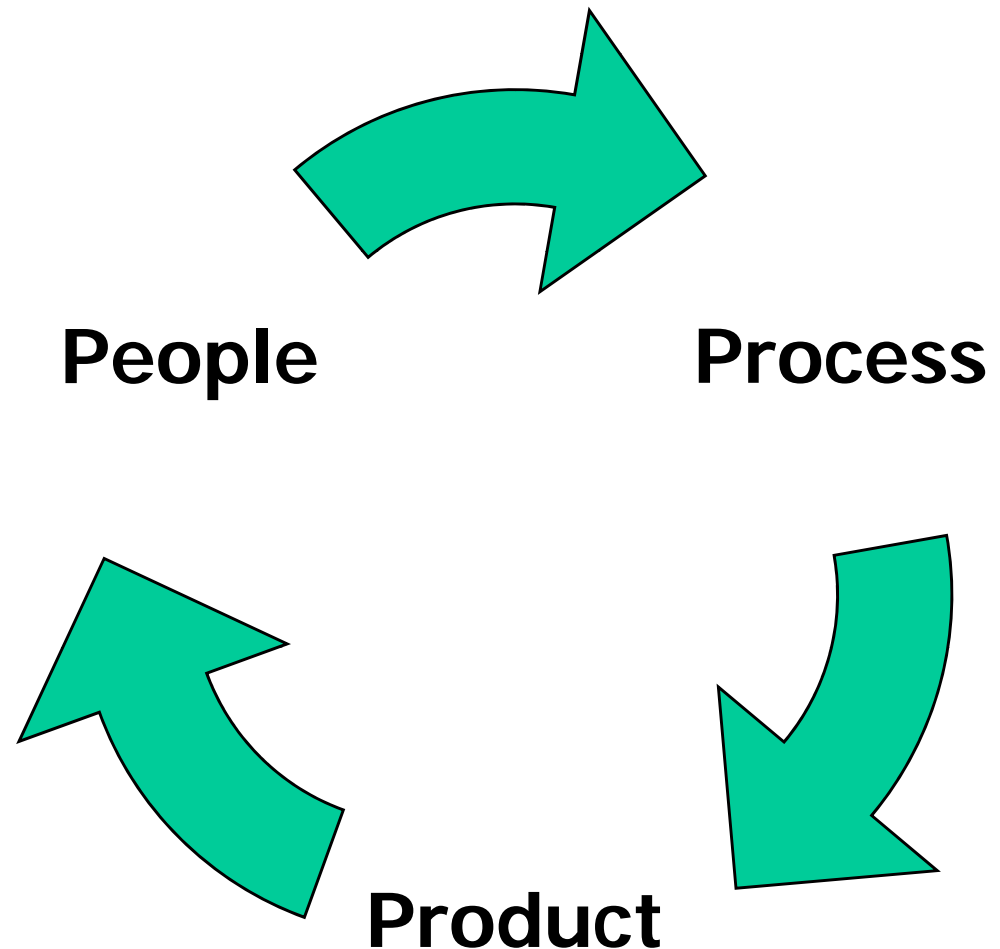
Questions?

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SEI Registered Products

PSP

TSP

TSPm

Personal Software Process

Team Software Process